



Scotchcal™ Graphic Film

Series 50

For Thermal Mass Transfer and Electronic Cutting

1. Product Description

Film series 50 is a 3-mil calendered vinyl film, available in 28 colors. The film has a clear, pressure-sensitive film with a blue liner on the white films, for easier visibility when weeding, and a white liner on all other film colors. Use this versatile film in both indoor and outdoor applications for thermal mass transfer and electronic cutting. It is removable with heat for up to three years and permanent for up to five years. This 3-mil film may be printed with thermal mass transfer and electronically cut.

2. Recommended Types of Graphics and End Uses

The products described in this Bulletin are covered by the [3M Basic Product Warranty](#). Please read the entire Bulletin for details.

- Pre-spaced, electronically-cut graphics
- Thermal mass transfer graphics
- Commercial and industrial signage including emblems, vehicle graphics, labels and striping

A. Limitations of End Uses

This 3M product is not designed or recommended for the following uses. Please contact us to discuss other options.

(1) Unsuitable End Uses for This Product

- Backlit signs
- Thermoformed graphics
- Graphics with more than two layers of film
- Application to riveted, corrugated, compound curved or complex contoured surfaces
- Graphics subjected to gasoline vapors or spills
- Graphics applied to substrates having coatings such as silicone

3. Compatible Products

- 3M™ Panagraphics™ III Wide-Width Flexible Substrate
- 3M™ Premasking Tape SCPM-3
- 3M™ Pre-spacing Tape SCPS-2

4. Characteristics

These are typical values for unprocessed product; processing may change the values. Contact your 3M representative for a custom specification.

A. Physical Characteristics

| Characteristic | Value |
|----------------|---|
| Material | Calendered vinyl |
| Colors | See Color Chart |
| Gloss | High gloss (except matte white and matte black) |
| Thickness | Without adhesive: 3.0 mil (0.076 mm) With adhesive: 4.0 to 4.5 mil (0.102 to 0.114 mm) |
| Adhesive type | Pressure-sensitive; removable |
| Adhesive color | Clear |
| Liner | Film colors 50-10, 50-100: Blue kraft paper All other film colors: White kraft paper |

| Characteristic | Value |
|--------------------------------|---|
| Tensile strength (minimum) | 8 pounds/inch at 72°F (1.4 kg/cm at 23°C) |
| Chemical resistance | Resists mild acids, mild alkalis and salts Excellent resistance to water (<i>does not include immersion</i>) |
| Adhesion | Acrylic: 4.0 pounds/inch (0.7 kg/cm) Alodine, aluminum: 5.0 pounds/inch (0.9 kg/cm) Glass: 3.0 pounds/inch (0.5 kg/cm) Fruehauf pre-painted panel: 4.0 pounds/inch (0.7 kg/cm) Polycarbonate: 4.0 pounds/inch (0.7 kg/cm) |
| About Polycarbonate substrates | Film series 50 typically adheres to solar-grade polycarbonate substrate. However, some lots of this substrate may inhibit the adhesion of the film. Contact 3M Commercial Graphics Technical Service if you are having difficulty with this combination. See Instruction Bulletin 5.7 for additional information. Polycarbonate substrates may require oven drying before use. Refer to the manufacturers' instructions. |
| Flammability | Call 1-800-328-3908 for information |

B. Color Chart

| No. | Color | No. | Color |
|--------|---------------|--------|----------------|
| 50-10 | White | 50-66 | Purple |
| 50-100 | Matte White | 50-73 | Grass Green |
| 50-11 | Transparent | 50-745 | Bright Green |
| 50-12 | Black | 50-76 | Medium Green |
| 50-120 | Matte Black | 50-78 | Dark Green |
| 50-24 | Lemon Yellow | 50-79 | Teal |
| 50-27 | Sunflower | 50-82 | Light Blue |
| 50-34 | Bright Orange | 50-84 | Azure Blue |
| 50-44 | Light Red | 50-88 | Sapphire Blue |
| 50-483 | Dark Red | 50-90 | Deep Navy Blue |
| 50-49 | Burgundy | 50-914 | Beige |
| 50-54 | Gold | 50-92 | Brown |
| 50-58 | Silver | 50-94 | Light Grey |
| 50-64 | Pink | 50-97 | Nimbus Grey |

C. Application Characteristics

| Characteristic | Value |
|--|--|
| Finished graphic application recommendations | Surface type: Flat and simple curved surfaces, without rivets Substrate type: Flexible signage, glass, metal, acrylic, polycarbonate*, fiberglass and painted surfaces Application temperature: 50° to 100°F (4° to 38°C) |
| Finished graphic exposure temperature | -50° to +150°F (-45° to +65°C) <i>Impact at low temperatures when film is applied to flexible substrates may result in film or substrate cracking.</i> |
| Applied film shrinkage | 0.004 to 0.023 inch (0.1 to 0.6 mm) |
| Graphic removal | Removable with heat from most substrates for up to 3 years; leaves little or no adhesive residue ¹ |

¹. The gold and silver colors of film series 50 may leave adhesive residue upon removal.

5. Warranty Information

A. Limitations and Disclaimers Applicable to All Warranties & Warranty Coverage Overview

The following is made in lieu of all other express or implied warranties, including any implied warranty of **merchantability** or fitness for a particular purpose or implied warranty arising out of a course of dealing, custom or usage of trade. 3M will replace or refund the price of any 3M materials that do not meet this warranty within the specified time periods. These remedies are exclusive. **In no case shall 3M be liable for any direct, indirect, or consequential damages, including any labor or non-3M materials charges.**

See the *3M Graphics Market Center Warranty Brochure* at 3Mgraphics.com, which gives the terms, additional limitations of the warranty, if any, and limitations of liability.

B. 3M Basic Product Warranty

All 3M products are warranted to be free of defects in materials and manufacture at the time of shipment and to meet the specifications stated in this Product Bulletin and as further set forth in the 3M Graphics Market Center Warranty Brochure.

C. Expected Performance Life (not a warranted durability)

Indoors: up to 5 years in a vertical orientation with typical usage

Outdoors: up to 3 years in a vertical orientation with typical usage

3M Product and Instruction Bulletins provide practical recommendations for using this product in a way that maximizes performance, but using other 3M products or procedures with this film does not change the terms of the warranty.

6. Graphics Manufacturing

This Bulletin does not contain detailed printing, processing, or application procedures. Refer to the 3M Related Literature section for further information.

A. Thermal Mass Transfer

Refer to the instructions provided by the thermal mass transfer system's manufacturer.

For the best results with thermal mass transfer printing, it may be necessary to wipe the gold and silver colors of film series 50 with isopropyl alcohol (IPA) before printing.

B. Electronic Cutting, Minimum Heights

Based on cutting and weeding evaluations that used Helvetica medium upper case copy, the recommended minimum cutting height is 0.375 inches (9.5 mm). Because of the differences in electronically-controlled cutting equipment and font characteristics, users should determine their own cutting and weeding capability.

Please refer to Instruction Bulletin 4.1 for detailed cutting information, including important factors that affect cutting quality and ability.

C. Application Tapes

The type of 3M application tape to use for this film depends on the type of graphic produced. See Instruction Bulletin 4.3 for details.

- Use prespacing tape SCPS-2 if the film is weeded and much of the liner is exposed and/or small letters and/or narrow stroke width.
- Use premasking tape SCPM-3 if very little of the liner is exposed and/or large letters and/or wide stroke width.

7. Application

Either a wet or dry application by hand method may be used.

A. Overlaps

We recommend using an overlap of at least 1/8 inch (3 mm) wherever pieces of film overlap.

8. Shelf Life, Storage and Shipping

B. Shelf Life

Total shelf life: 3 years from the date of manufacture on the original box.

If you do process the film, do so within 2 years and apply within 1 year.

If you do not process the film, apply it within 3 years.

C. Storage Conditions

- 40° to 90°F (4° to 32°C)
- Out of sunlight
- Clean dry area
- Original container
- Bring the film to print room temperature before using

D. Shipping Finished Graphics

Flat (may be separated by paper), or rolled printed side out on 5 inch (13 cm) or larger core. This helps prevent the liner and, if used, the application tape from popping off.

9. Health and Safety



When handling any chemical products, read the manufacturers' container labels and the Material Safety Data Sheets (MSDS) for important health, safety and environmental information. To obtain MSDS sheets for 3M products go to 3M.com/MSDS, or by mail or in case of an emergency, call 1-800-364-3577 or 1-651-737-6501.

When using any equipment, always follow the manufacturers' instructions for safe operation.

10. 3M Related Literature

Before starting any job, be sure you have the most current Product and Instruction Bulletins.

The information in 3M Product and Instruction Bulletins is subject to change. Current Bulletins are available at 3Mgraphics.com. The following applicable Bulletins provide information and processes you need to properly make the graphics described in this Bulletin. Additional Bulletins may be needed as indicated in the 3M Related Literature section of other 3M components you use.

Bulletin types: PB = Product Bulletin; PB-IB = Product & Instruction Bulletin; IB = Instruction Bulletin

| Subject | Type | Bulletin No. |
|--|---|--------------|
| 3M™ Panagraphics™ III Wide-Width Flexible Substrate | PB | P3 |
| Design of graphics | IB | 2.1 |
| Scoring and cutting | IB | 4.1 |
| Using 3M application tapes; premasking and prespacing for films | IB | 4.3 |
| Application, substrate selection, preparation and substrate-specific application techniques | IB | 5.1 |
| Application, wet method for translucent screen printed, thermal mass transfer and cut graphics | IB | 5.7 |
| Application, general procedures for indoor and outdoor dry applications | IB | 5.5 |
| Storage, handling, maintenance, removal | IB | 6.5 |
| 3M Graphics Center Warranty Brochure | go to www.3Mgraphics.com , Warranties | |

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11. Bulletin Change Summary

Removed banner material 8450, which is obsolete. Liner color for white films 50-10 and 50-100 is now blue for easier visibility when weeding; your current inventory of these films with white liner cannot be exchanged for blue liners.



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